Amendments to the Specification:

Please amend the specification as follows:

Please replace the paragraphs at page 3, lines 11-22 with the following rewritten paragraphs:

The first aspect of the present invention provides a gas permeable substrate, comprising: a porous metallic plate having a plurality of [[pores]] through holes which form openings in an upper surface and/or a lower surface thereof; and particles filled in the [[pores]] through holes, wherein at least one of the upper surface and the lower surface of the porous metallic plate is substantially smooth.

The second aspect of the present invention provides a solid oxide fuel cell, comprising: a gas permeable substrate having a porous metallic plate which includes a plurality of [[pores]] through holes forming openings in an upper surface and/or a lower surface thereof; and particles filled in the [[pores]] through holes, wherein at least one of the upper and lower surfaces of the porous metallic plate are substantially smooth, and single cells are stacked, each single cell including power generating elements stacked on an upper surface and/or a lower surface of the gas permeable substrate.

Please replace the paragraphs starting at page 4, line 28 through page 5, line 19 with the following rewritten paragraphs:

A gas permeable substrate of the present invention includes: a porous metallic plate having a plurality of pores which form openings in the upper surface and/or the lower surface thereof; and particles filled in the pores. The gas permeable substrate is characterized in that at least one of the upper and lower surfaces of the porous metallic plate is substantially smooth. Specific embodiments are shown in FIGS. 1 to 3. As shown in FIG. 1, a gas permeable substrate 1 of the present invention includes a porous metallic plate 3 and a particle layer 7. The porous metallic plate 3 includes a plurality of [[pores]] through holes 5, and openings 5a and 5b based on the [[pores]] through holes 5 are formed on an upper surface 3a and a lower surface 3b of the porous metallic plate 3. Particles are filled in these [[pores]]

through holes 5 to form the particle layer 7 and the upper surface thereof is made smooth. The gas permeable substrate 1 of the present invention is thus obtained.

With such a construction, the gas permeable substrate 1 becomes lightweight and thin, and functions as both a supporting member and a gas passage. Moreover, an entire device using this gas permeable substrate 1 can be designed to be lightweight and small. Moreover, since gas passes through [[holes]] pores within the particle layer 7, the gas can pass through the substrate while being efficiently diffused. In terms of the [[pores]] through holes 5 included in the porous metallic plate 3, each [[pore]] through hole 5 is preferably penetrated in the vertical direction, namely, in the thickness direction of the plate. However, it is sufficient if the [[pore]] through holes 5 is penetrated in the vertical direction by having an opening on one surface and communicating with another [[pore]] opening on the other surface within the metallic plate 3.

Please replace the paragraph at page 6, lines 9-11 with the following rewritten paragraph:

The particles filled in the [[pores]] through holes 5 and the particles covering the upper and lower surfaces 3a and 3b of the porous metallic plate 3 may be of the same material or different materials.

Please replace the paragraphs starting at page 6, line 21 through page 7, line 17 with the following rewritten paragraphs:

The gas permeable substrate 1 of the present invention is characterized in that the surface of the porous metallic plate, namely, any one of or both of the upper and lower surfaces 3a and 3b are substantially smooth. Accordingly, the porous metallic plate 3 can be covered with another thin film layer with good adhesion. Even if the [[pores]] through holes 5 are not filled with the particles until the surface of the porous metallic plate 3 and the openings becomes flat, an arbitrary thin film layer can be formed on the surface. Specifically, since the porous metallic plate is reduced in thickness as described later, in some cases, the openings and the surface of the metallic plate cannot be made completely flat in some cases by filling the [[pores]] through holes with the particles. Therefore, in the gas permeable

substrate of the present invention, the surface thereof is somewhat uneven in some cases, but the surface is substantially smooth. Accordingly, the adhesion with another thin film layer is greatly improved compared to the conventional art. Moreover, since the surface of the metallic plate 3 is formed to be flat by filling the [[pores]] <u>through holes</u> 5 with the particles, an arbitrary thin film layer can be formed on the surface regardless of size of the [[pores]] <u>through holes</u> 5.

For such a porous metallic plate 3, for example, sintered metal body such as foam metal, a metal film with pores formed by chemical etching, and a metal film with [[pores]] <u>through holes</u> formed by punching with a laser or electron beam can be used. In the case where the porous metallic plate is thin and the shape or the openings thereof cannot be maintained, a frame is provided on the outside thereof to support the porous metallic plate. Specifically, as shown in FIGS. 4A and 4B, when a frame 33 is provided in the periphery of the gas permeable substrate 1, gas permeable substrates 30 and 32 with improved mechanical strength and the [[pores]] <u>through holes</u> 5 maintained, can be obtained. For example, as shown in FIG. 10, when the porous metallic plate 3 is etched from the both sides, a shape suitable for filling particles can be obtained.

Please replace the paragraph starting at page 7, line 29 through page 8, line 16 with the following rewritten paragraph:

As described above, according to the present invention, the [[pores]] <u>through holes</u> of the porous metallic plate are filled with particles, and the surface thereof is substantially smooth. Accordingly, it is possible to provide a lightweight and thin gas permeable substrate which has high gas diffusion and a high contact rate and adhesion with the functional material. Herein, the particle layer 7 is formed within the [[pores]] <u>through holes</u> 5 and on the upper surface 3a in FIG. 1. However, as shown in FIG. 2, the gas permeable substrate of the present invention may be a gas permeable substrate 10 in which the particle layer 7 is provided in the [[pores]] <u>through holes</u> 5 and the upper and lower surfaces 3a and 3b of the porous metallic plate 3. This enables the strength of the gas permeable substrate to be further increased. As shown in FIG. 3, the gas permeable substrate of the present invention may be a gas permeable substrate 20 in which the particle layer 7 is provided only within the [[pores]]

through holes 5. Thus, a gas permeable substrate formed into a thin film can be obtained. Moreover, as shown in FIG. 7, it is not necessary that all the [[pores]] through holes 5 of the porous metallic plate 3 are filled with the particle layer 7, and ever if the gas permeable substrate has the [[pores]] through holes filled with particles to some extent and has a smooth upper surface, the gas permeable substrate is within the technical scope of the present invention.

Please replace the paragraph starting at page 9, line 24 through page 10, line 11 with the following rewritten paragraph:

The SOFC of the present invention can be an SOFC in which the pores of the porous metallic plate are filled with a reforming catalyst and an electrode material and a stacking structure including two or more layers is formed in the pores. Herein, the electrode material is a concept including a fuel electrode material constituting the fuel electrode layer, an air electrode material constituting the air electrode layer, and an intermediate layer material constituting the intermediate layer. Specifically, as shown in FIG. 6, a gas permeable substrate 51 can be used in which a reforming catalyst layer 57 and a fuel electrode layer 52 are provided within the [[pores]] through holes 5 of the porous metallic plate 3. An SOFC 50 of the present invention can be obtained by providing a first intermediate layer 53, an electrolyte layer 54, a second intermediate layer 55, and an air electrode layer 56 on the gas permeable substrate 51. In the SOFC 50, since the reforming catalyst layer 57 and the fuel electrode layer 52 are provided within the [[pores]] through holes 5 of the porous metallic plate 3, fuel gas can be supplied to the fuel electrode layer 52 after flowing through the reforming catalyst layer 57 to be reformed so as to have a preferable gas composition. Moreover, since the reforming catalyst and the fuel electrode material are arranged within the porous metallic plate, the SOFC can be further reduced in thickness.

Please replace the paragraph at page 11, lines 4-13 with the following rewritten paragraph:

In the SOFC 50 of the present invention, the pores 5 of the porous metallic plate 3 are filled with the reforming catalyst layer 57 and the fuel electrode layer 52, but the present

invention is not limited to this. The [[pores]] through holes may be filled with another electrode material to be formed into a two layer structure. Specifically, the fuel electrode layer 52 and the first intermediate layer 53 can be provided within the [[pores]] through holes 5. In the case of an SOFC not using the intermediate layer, the fuel electrode layer and the electrolyte layer may be provided within the [[pores]] through holes. The fuel gas can be made suitable by providing the reforming catalyst layer 57, but the reforming catalyst is not required to be provided.

Please replace the paragraph starting at page 12, line 28 through page 13, line 7 with the following rewritten paragraph:

As shown in FIG. 1, for the porous metallic plate 3, a plurality of [[pores]] through holes of ϕ=0.1 mm were provided by photo etching in an etching board which was composed of SUS 304 and 0.1 mm thick. Subsequently, for the particle layer 7, paste of the fuel electrode material which was composed of Ni-SDC and had a particle size of 2 μm was applied with a thickness of 0.12 mm on the porous metallic plate 3 by screen printing, and then baked at 1050 °C in H_2 reducing atmosphere. In this manner, the gas permeable substrate shown in FIG. 1 was obtained. FIG. 10 shows an enlarged photograph of a section of this gas permeable substrate.

Please replace the paragraphs starting at page 13, line 17 through page 14, line 21 with the following rewritten paragraphs:

As shown in FIG. 7, for the porous metallic plate 3, [[pores]] through holes of ϕ=0.2 mm were provided by laser processing in a punching board which is composed of Ni and 0.2 mm thick. Subsequently, for the fuel electrode layer, a fuel electrode material which was composed of Ni-YSZ and has a particle size of 2 μm was pressed and attached with a thickness of 0.15 mm on the porous metallic plate 3 by the green sheet method, and then baked at 1050 °C in H_2 reducing atmosphere to obtain a gas permeable substrate provided with the fuel electrode layer 42. Further, for the thin film power generating element, the obtained gas permeable substrate was covered by screen printing with an electrolyte material which was composed of YSZ and has a particle size of 0.03 μm to form the electrolyte layer

43. The obtained electrolyte layer 43 was covered with an air electrode material which was composed of SSC (Sm and Sr added cobalt oxide) and had a particle size of 5 μm by screen printing with a thickness of 10 μm to form the air electrode layer 45. In this manner, an SOFC cell 60 shown in FIG. 7 was obtained. In the SOFC cell 60, power generation of 0.1 W/cm^2 was confirmed.

EXAMPLE 4

As shown in FIG. 3, for the porous metallic plate 3, a plurality of [[pores]] <u>through holes</u> of ϕ =0.1 mm were provided by photo etching in an etching board, which is composed of SUS 304 and 0.1 mm thick. Subsequently, for the particle layer 7, paste of the fuel electrode material which was composed of Ni and had a particle size of 10 μm was applied with a thickness of 0.12 mm on the porous metallic plate 3 by screen printing, and then baked at 1050 °C in H_2 reducing atmosphere. In this manner, the gas permeable substrate 20 shown in FIG. 3 was obtained.

EXAMPLE 5

As shown in FIG. 8, for the porous metallic plate 3, a plurality of [[pores]] <u>through holes</u> of ϕ =0.1 mm were provided by photo etching in an etching board, which was composed of SUS 304 and 0.1 mm thick. Subsequently, paste of the fuel electrode material which was composed of Ni-SDC and had a particle size of 2 μm was applied on the upper surface 3a with a thickness of 60 μm by screen printing to form the fuel electrode layer 52 Furthermore, paste of the reforming catalyst layer material which was composed of Pt and had a particle size of 3 μm was applied on the lower surface 3b with a thickness of 60 μm by screen printing, and then baked at 1050 °C in H_2 reducing atmosphere to form the reforming catalyst layer 57. In this manner, the gas permeable substrate 70 shown in FIG. 8 was obtained.

Please replace the paragraph starting at page 14, line 30 through page 15, line 22 with the following rewritten paragraph:

In the examples 1 to 5, the gas permeable substrates which had good adhesion between the substrate and the particles and were made thin were obtained. Since there was the fuel electrode layer on the upper surface of the porous metallic plate and within the [[pores]] through holes in each of the gas permeable substrates of the examples 1 to 3 and 5, the gas was diffused on the upper surface of the metallic plate and efficiently transferred. In the example 2, since the fuel electrode layers were on the upper and lower surfaces of the porous metallic plate, the stress from the upper and lower surfaces was well balanced, and the durability of the substrate was improved. In the example 3, the thin SOFC cell further including the power generating element on the gas permeable substrate was easily obtained. Furthermore, in the example 3, the fuel electrode material was pressed and attached by the green sheet method, which is an easy manufacturing method, so that man-hours were reduced. In the example 4, since the fuel electrode layer was formed within the [[pores]] through holes, the adhesion between the fuel electrode layer and the substrate material was good. In the example 5, since the fuel electrode layer and the reforming catalyst layer were provided within the [[pores]] through holes, it became possible to further reduce the thickness. On the contrary, in the comparative example 1, since the metallic mesh is covered with the fuel electrode layer, the fuel electrode layer was thickened. Moreover, it is inferred that the adhesion between the porous metallic plate and the fuel electrode layer was low since the contact area between the porous metallic plate and the fuel electrode layer was small. Moreover, when the particle layer is made thin, it is impossible to obtain a smooth surface because of the surface shape of the porous metallic plate 3'.

Please replace the paragraph at page 16, lines 1-6 with the following rewritten paragraph:

As explained above, according to the present invention, the [[pores]] through holes of the porous metallic plate are filled with the particles and the surface thereof is smoothed. Therefore, it is possible to provide a thin and lightweight gas permeable substrate which has high gas diffusion and has a high contact rate and adhesion with the functional material, and to provide a solid oxide fuel cell using the same.